

- a) feeding natural gas and H_2O into a reforming reactor to form a gas mixture,
- b) subjecting the gas mixture to a one-step reforming reaction under supercritical heat and pressure conditions for water to form a reformed gas mixture; and
- c) separating the reformed gas mixture into a H_2 -rich gas stream and a CO_2 -rich gas stream.

22. (New) The method according to claim 21, wherein the temperature in the reforming reactor is from about 400°C to about 600°C .

23. (New) The method according to claim 21, wherein the pressure in the reforming reactor is from about 200 to about 500 bar.

24. (New) The method according to claim 22, wherein the pressure in the reforming reactor is from about 200 to about 500 bar.

25. (New) The method according to claim 21, wherein the separated CO_2 -rich gas stream has a pressure within a range from 20 to 200 bar.

26. (New) The method according to claim 22, wherein the separated CO_2 -rich gas stream has a pressure within a range from 20 to 200 bar.

27. (New) The method according to claim 23, wherein the separated CO_2 -rich gas stream has a pressure within a range from 20 to 200 bar.

28. (New) The method according to claim 21, wherein the gas mixture in the reforming reactor is passed over a catalyst bed.

29. (New) The method according to claim 22, wherein the gas mixture in the reforming reactor is passed over a catalyst bed.

30. (New) The method according to claim 23, wherein the gas mixture in the reforming reactor is passed over a catalyst bed.

31. (New) The method according to claim 25, wherein the gas mixture in the reforming reactor is passed over a catalyst bed.

32. (New) The method according to claim 21, wherein the reaction in the reforming reactor is carried out without a catalyst.

33. (New) The method according to claim 22, wherein the reaction in the reforming reactor is carried out without a catalyst.

34. (New) The method according to claim 23, wherein the reaction in the reforming reactor is carried out without a catalyst.

35. (New) The method according to claim 25, wherein the reaction in the reforming reactor is carried out without a catalyst.

36. (New) The method according to claim 28, wherein the reaction in the reforming reactor is carried out without a catalyst.

37. (New) The method according to claim 21, which further comprises injecting the separated CO₂-rich gas stream into marine formations.

38. (New) The method according to claim 21, which further comprises transporting the separated H₂-rich gas stream for hydrogenation.

39. (New) The method according to claim 21, which further comprises converting the separated H₂-rich gas stream to energy / fuel in fuel cells.

40. (New) The method according to claim 21, which further comprises transporting the separated H₂-rich gas stream for production of electricity.